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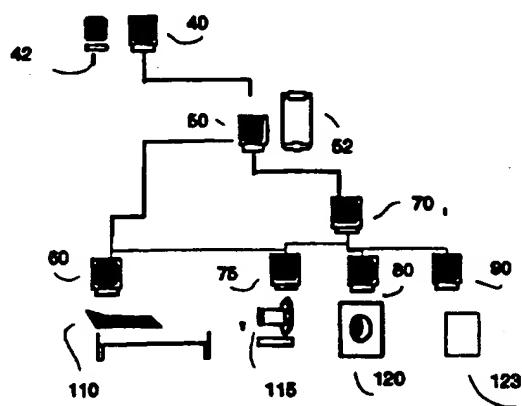
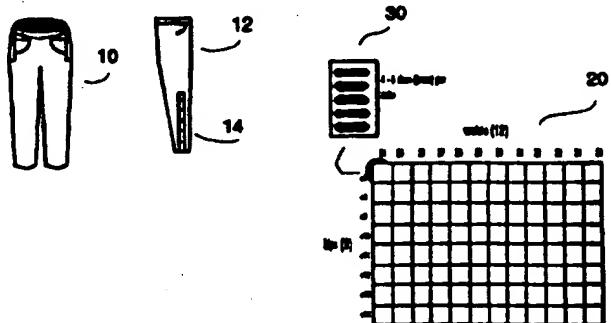
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(57) Abstract

The present invention is a system and method for custom tailoring and manufacturing apparel by using numerous try-on apparels (10) of differing, predetermined dimensions to make a finished product. A system (40) is used to keep track of the number of try-on apparels (10) and each of their dimensions. As a consumer tries on one of these try-on apparels (10), a device (40b, 40c) associated with the system (40) is used to collect the consumer's responses about fit. If one try-on apparel (10) does not fit, the system (40) suggests a next one to try, according to pre-defined rules. When a particular try-on apparel's fit has been approved for purchase by the consumer, this is reported to a manufacturing system (70), where a piece of apparel corresponding to the dimensions of the approved try-on apparel is cut, stitched, treated, and shipped as a finished apparel.



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Custom Apparel Manufacturing Apparatus and Method

Technical Field This invention relates generally to the custom manufacturing of fitted apparel and more particularly to an apparatus and method for manufacturing custom tailored apparel using multiple try-on apparels and a system.

Background Art

For years, a basic problem in making fitted apparel in a cost effective manufacturing system has been determining how to capture a person's body dimensions so that a piece of clothing can be constructed to fit that person well and without undue expense for the manufacturer, retailer or consumer. Apparel designed for three-dimensional objects such as a human body, can be complex to make, since changes in one dimension, such as rise or waist, in the case of pants, may require changes in hip dimensions in order to insure a fit.

Many consumers, particularly women, have trouble finding volume manufactured or ready-made apparel such as blue jeans, that fit to their satisfaction. One cause of this is that the traditional sizing system for women used by volume manufacturers is essentially a single dimensional one developed in 1941. Based on statistical averages, this sizing system results in sizes represented as one abstract dimension, such as size 6 or size 8. Minor variations of this have been added, over time to permit petite or plus sizes, still with one abstract dimension within the petite or plus size subclass, such as size 6 petite or size 6 long or short. Sizes in men's apparel such as pants, shirts and suits are not much

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different, although shirt sizes may be stocked by neck or arm length dimensions and a few combinations of standard sizes. Generally speaking, the same is true for most other types or configurations of apparel such as footwear, gloves, coats, dresses and so on. While it is theoretically possible to stock a large number of 5 varying standard sizes, to offer more options to a consumer, the costs of maintaining large inventories make that prohibitive. Consequently, only a few standard sizes are offered in most retail stores for consumers.

Nevertheless, in just the simple case of women's pants, there are literally thousands of combinations of waist, hips, rise and inseam measurements that are 10 possible for a pair of blue jeans if a large population is to be fitted. Only one particular combination is likely to be a good fit for any given person. If any one of a person's dimensions are different from the statistical averages, fitting will be harder. If waist size is narrower than the average or the customer desires pants having a shorter rise, it will be difficult to get a good fit from ready-to wear 15 clothing.

In a sample of 500 women measured in a survey, only 11 of the 500, or about 2%, had exact matches to the industry standard sizes.

Hence, many consumers reject ready-to wear and turn to custom fitted clothing. In order to make something custom fit, one must capture key body dimensions, 20 then construct the garment. Four traditional ways have been used in the past to accomplish this:

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1. Use a tape measure to measure the person for key dimensions, and then use those dimensions to build the garment.
2. Place the actual garment that the consumer will wear on the person and make tailoring adjustments to that garment.
- 5 3. Use an adjustable garment to capture body dimensions.
4. Use some sort of mechanical, optical or video device to capture body dimensions.

The first two approaches used together constitute classical custom tailoring.

While generally producing a good fit, the skilled labor of the tailor or seamstress required for traditional custom tailoring makes it too costly for manufacturers and retailers of ready to wear clothing to use, and too expensive for many consumers.

Adjustable try-on garments or patterns are known in the art and have been used to address the problem. This may also require skilled labor at the retail site, in order for the adjustments to be made properly. Whether only one adjustable garment is used or even several adjustable garments in the standard sizes, a considerable amount of labor and expense also remains in the cutting and manufacturing side, since each garment must be uniquely cut to the dimensions adjusted on each customer. The use of computers can speed up the collection of the information that needs to be transmitted about the adjustments to be made, but the unique cutting requirements are still costly and time-consuming. Even where computers are used to create a scaled pattern based on actual

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measurements, the costs and time for uniquely cutting to those dimensions usually remain significant.

Materials such as denim, leather, vinyl or fur or others that are difficult to work with, complicate the problem further. If the garment is not cut satisfactorily the

- 5 first time, it may be prohibitively expensive to adjust it to fit if the customer is dissatisfied with the fit of the actual garment.

Hence, other attempted improvements in the area stem from the use of optical or electrical sensors and a computer to improve accuracy of the measurements. In this type of scheme, the optical or electronic device is used to sense and capture

- 10 the measurements of a person's body. In one system, the individual wears a special garment having measuring devices that can be "read" by the system. This can be combined with a computer system such as one which creates or scales a special pattern based on such readings. Thus, the measurements can be taken or made interactively and accurately, but each garment must still be cut to the
- 15 unique dimensions so ascertained.

While this improves accuracy and collection of the custom information, it, too, does not solve the remaining problems and costs of unique cutting and assembly facing the volume manufacturer. Volume manufacturers may make as many as 60,000 or 70,000 pairs of pants a week in factories around the world. Costs have

- 20 typically been kept low with the use of uniform sizes, which lowers or eliminates the need for specially skilled labor, and specialized, unique cutting

- 5 -

and tracking. Custom tailoring done according to the traditional methods is inconsistent with high volume manufacturing and low costs.

Finally, there is a significant subjective element to a sense or feel of fit that varies from customer to customer. For example, two customers whose measurements 5 are exactly the same, may have different tastes regarding looseness or tightness of fit, with one preferring a looser garment and the other a tighter garment. Or, two customers with identical measurements could differ in their style preferences, with one preferring to wear a pair of denim jeans low on the hips and the other higher. In order to conform to a customer's subjective preferences, one or more 10 of the other dimensions may need to be adjusted since they are interrelated. If only objective measurements are used for the custom garment without an actual fitting, these subjective elements may frequently cause a garment constructed only from objective data to be returned by the consumer. A high return or reject rate is costly for both retailers and manufacturers

15 **Disclosure of Invention**

The present invention is a system and method for custom tailoring and manufacturing apparel by using numerous try-on apparels of differing, pre-determined dimensions to make a finished product. A system is used to keep track of the number of try-on apparels and each of their dimensions. As a 20 consumer tries on one of these try-on apparels, a device associated with the system is used to collect the consumer's responses about fit. If one try-on apparel does not fit, the system suggests a next one to try, according to pre-defined rules. When a particular try-on apparel's fit has been approved for purchase by the

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consumer, this is reported to a manufacturing system, where a piece of apparel corresponding to the dimensions of the approved try-on apparel is cut, stitched, treated, and shipped as a finished apparel.

It is an object of the present invention to provide a method and apparatus for
5 producing custom fitting apparel in volume without the higher costs of
traditional custom methods. Apparel manufactured according to the method and
apparatus of the present invention can be constructed in volume from one of
numerous pre-determined dimensions corresponding to the approved, pre-
determined dimensions of a try-on apparel actually selected and tried by a
10 customer.

It is a further object of the present invention to provide retailers and stores with
an easily used system for collecting fit information to identify a particular
approved try-on apparel to be manufactured and purchased.

It is a feature of the present invention that it allows customers to actually try an
15 apparel on for fit and feel before a custom order is placed.

It is an aspect of the present invention that it permits a manufacturer of custom
apparel to optimize use of materials by providing pre-determined dimensions
that can be used to cut and manufacture finished apparel. Layouts for the
various dimensions can be selected in advance to insure optimal use of fabric, for
20 example, while still providing custom fitting.

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It is another aspect of the present invention that it can be implemented in a number of types of systems, from simple manual or electronic devices to computerized systems.

Yet another feature of the invention is its ability to collect approved fit information by customer and convey it to remote manufacturing sites. Using the pre-determined dimensions, or codes corresponding to them, together with ordering and shipping information a retailer can fill orders quickly for items not carried in inventory.

Still another feature of systems constructed according to the present invention is that they use expert system rules. As new types of apparel are considered for manufacture, such as shirts or footwear, for example, rules appropriate to fitting them can be developed and implemented.

Brief Description of Drawings

Figure 1 is an illustrative front and side view of a try-on apparel, shelves containing numerous other try-on apparels, and a system for storing information about them for transmission to a manufacturing system, according to the present invention.

Figure 2 is a schematic drawing illustrating some types of apparel that can be made using the present invention.

Figure 3 is a front view of a series of shelves containing try-on apparel.

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Figure 4 is a flow diagram depicting the principal steps in the fitting process.

Figure 5 is a flow diagram illustrating detailed steps of part of the fitting process.

Figure 6 is a flow diagram showing another example a possible detail step of the fitting process.

5 Figure 7 is a flowchart of the principal logic of a system constructed according to the present invention.

Figure 8 is an illustrative front perspective view of some possible embodiments of a system constructed according to the present invention.

Figure 9 is a front perspective view illustrating some types of input devices.

10 Figure 10 is a flow diagram of the steps used to determine the dimensions to use to construct try-on apparel, the number to make and the rules for trying them.

Figure 11 shows three examples of dimensions considered in a hypothetical fitting.

Figure 12 is a schematic view of a touchscreen interface of a device used to

15 collect fit information according to the present invention, depicting a beginning screen.

Figure 13 is a schematic view of a touchscreen interface of a device used to collect fit information according to the present invention, depicting a screen showing options eliminated by a prospective buyer's fit responses.

20 Figure 14 is a schematic view of a touchscreen interface of a device used to collect fit information according to the present invention, depicting an alternative way of entering initial dimensions information.

Figure 15 is a schematic view of a touchscreen interface of a device used to collect fit information according to the present invention, depicting the results from

two try-ons.

Figure 16 is a schematic view of a touchscreen interface of a device used to collect fit information according to the present invention, depicting hem length options of a selected try-on apparel.

- 5 Figure 17 is a schematic view of a touchscreen interface of a device used to collect fit information according to the present invention, depicting final approval and purchase options.

Best Mode for Carrying out the Invention

In Figure 1, a try-on apparel 10 is shown in the form of a pair of women's jeans.

- 10 As will be apparent to those skilled in the art, any of a number of different types of apparel such as apparel for humans or pets or fitted coverings for furniture or other objects capable of significant variations in dimensions can be made according to the method and apparatus of the present invention.

A side view 12, is shown of try-on apparel 10, bearing a measuring device 14. In a preferred embodiment of the present invention, a considerable number of try-on apparels 10, each having different dimensions from the others are kept at a retail store or site in containers or racks such as shelves 20. For ease of access, each cube 30 of shelves 20 contains a specific number of try-on apparels 10. Here, five different try-on apparels 10 are shown in a cube 30. In this example, nearly 500

- 20 try-on apparels, each having dimensions from each of the others are used. In a preferred embodiment, these are not ordinarily used as goods inventory, but are reserved for try-ons.

- 10 -

In a preferred embodiment, try-on apparels 10 are stored in shelves 20 according to gradations in sizes of their dimensions. For example, for women's pants, try-on apparels 10 having a waist size of 24 would be stored in the first column of shelves 20, with each cube 30 holding 5 pairs of the same hip size. Hip sizes

- 5 increase by an inch for each cube 30 of five try-on apparel 10. Within a cube 30, try-on apparels 10 having five different rise measurements are kept for each particular waist/hip combination in this example. As will be shown, a method of the present invention is used to determine the number of try-on apparels 10 to be made for a store, together with their dimensions for a selected design and
- 10 configuration of apparel such as women's jeans.

Still in Figure 1, system 40 is used within a retail store to store the dimensions of

each of the try-on apparels 10 in shelves 20. Additional systems or terminals 42

can be used as well. According to the method and apparatus of the present

invention, the customer selects try-on apparels 10, and reports fit information to

- 15 a clerk for entering into system 40. If the first selection does not fit, system 40

recommends the next try-on apparel 10 to try, using the customer's fit

information responses. Fit information responses might include a request to

make the waist looser, for example. System 40 will use that information to

determine which try-on apparel 10 to suggest next. When fit has been approved

- 20 by the customer, this can be indicated to system 40 and further conveyed to a

server 50, having network and other address information stored on disks or other

storage devices 52. The exact dimensions of the try-on apparel 10 approved by the

customer can then be transmitted on to cutter controller 60.

In one preferred embodiment, cutter controller 60 will contain information about pre-defined patterns for cutting parts of fabric according to the exact dimensions of try-on apparel 10 approved by the customer. Once cut, the fabric can be tracked by manufacturing system 70. Manufacturing system 70 may 5 include several subsystems, such as QA tracking system 80 and shipping system 90. After cutting, the fabric may be stitched at stitching station 110, treated at treatment station 120, packaged at station 123 and then shipped to the retail store or directly to the customer by shipping system 90.

Turning now to Figure 2, some types of try-on apparel 10, are shown. Try-on 10 apparel 10 is shown here as a pair of women's jeans, having pre-determined hip

10a, waist 10b and rise 10c dimensions. In a preferred embodiment, rise is measured as the distance between the crotch and the waist of a pair of pants or jeans, from front to back. If the rise is shorter, the waist will sit lower on the wearer. If the rise is higher, the waist will be higher on the wearer.

15 Still in Figure 2, an apparel of another type of configuration is depicted as shirt 13. Similarly, footwear such as boots 17 or other fitted apparel such as gloves 18 can be made according to the method and apparatus of the present invention.

Again in Figure 2, a pattern 10x is shown having several parts, 10z. Each part can be marked with a code 10y which corresponds to the same dimensions as a 20 particular try-on apparel 10.

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Also in Figure 2, a side view 12 of try-on apparel 10 is shown, with a measuring device 14 attached to an outer leg. In a preferred embodiment, device 14 is marked with the allowable dimensions for an inseam length for a pair of jeans.

Turning now to Figure 3, it can be seen that each cube 30 of shelves 20 contains

5 five try-on apparel 10, all of which have the same hip 10a and waist 10b measurements, but each having a different rise 10c measurement. Thus, in this illustration of a preferred embodiment of the invention, nearly 500 different pairs of try-on apparel 10 are used to determine fit. In a preferred embodiment, for each waist, hip and rise combination, there are at least 9 possible inseam or hem

10 lengths. Thus a matrix of several thousand different body dimension combinations or sizes is used to produce a finished apparel.

With reference now to Figure 4, the method and apparatus used to determine fit are shown in a flow diagram of the process at a retail store. After a customer has entered the store, at Step A0, a sales clerk can measure the customer at step A1 or,

15 alternatively, ask the customer his or her standard size. Next, at step A12, the clerk enters hip 10a, waist 10b, and rise 10c information into the system, using the data collected from the customer. At step A3, the system will suggest a specific try-on apparel 10 to try on. In the situation where there are several hundred or thousands of try-ons, the clerk typically gets the specific try-on apparel 10

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suggested by the system shown here as step A4. After the customer tries this try-on apparel 10, if he or she likes the fit and feel of try-on apparel 10 as indicated at step A11, the clerk proceeds to step A13 to capture information about hem lengths or inseam tape measurements and then enters an order into the system

5 at step A14.

Still in Figure 4, if the customer wants modifications, as illustrated at step A5, such as a looser waist or hips or a higher or lower rise, these modifications are indicated to the system at step A6 by the clerk. Using pre-determined rules the system recommends at step A7, a new try-on apparel 10 to try, having

10 dimensions that more closely approximate those indicated as desirable. The clerk gets the new try-on apparel 10 at step A8, and the customer tries that on at step A9. If the customer likes the fit and feel of that try-on apparel 10 (step A12), steps A13 and A14 are taken. If not, and the customer wants additional modifications, as shown at step A10, steps A6 through A10 are repeated until the customer

15 either approves a try-on apparel 10, or decides not to purchase (DNP).

In Figure 5, a more detailed view of the operation of some of the steps of the present invention is shown in a flow diagram. Here, at step B0, a customer has tried on a try-on apparel 10 that is a pair of pants and wants more room in the seat area. Using pre-determined rules, the system suggests expanding hip 10a

20 measurements at step B1. If this new try-on apparel 10 fits (Step B2), the clerk proceeds to step A13 in previous Figure 4 to collect additional information. Back in Figure 5, if the new try-on apparel 10 does not fit, the system suggests

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expanding hip 10a measurements again and will suggest yet another try-on apparel 10, having these new dimensions at step B3. At step B4, the fit of this try-on apparel 10 is checked. If it does not fit, the system proceeds to step B5 to see if there is a reasonable fashion limit. For example, while hundreds or thousands of

5 garments can be defined by the present invention, a particular manufacturer may decide that it is not economically feasible to try to sell garments having certain dimensions. These fashion limits can be included in the system. The system may suggest an alternate set of try-on apparel 10 such one having a taller rise 10c, as indicated at step B6. It is possible that that or a larger waist 10b, as could be

10 suggested at step B6, might suggest a try-on apparel 10 that will fit the customer but stay within the fashion limits imposed by the manufacturer. If the new try-on apparel 10 fits, (Step B7) the system instructs the clerk to go to Step A13. If not, another suggestion may be made at step B8, namely start with larger waist.

In Figure 6, another set of variations in the process is shown in which the

15 customer wants her jeans to sit lower on her hips (step C0). The present invention will suggest a shorter rise, first at Step C1, and continue until a fashion limit is reached at step C5. If the try-on apparel 10 still does not fit, the system will suggest a larger waist, as shown at Step C6. Processing continues until a fit is approved or the customer decides not to purchase.

20 With reference now to Figure 7, an overall flow diagram of the logic of a preferred embodiment is shown. Assuming the customer tries on a pair of try-

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on apparel 10 at step D0, the system checks for fit at D1. If that try-on apparel 10 fits, and the customer wants to order, the order is taken at step D2. If that apparel does not fit, the system checks to see if the waist dimension was approved by the customer at D3. If not, a next check is made to see if a waist fashion limit has been 5 reached at step D4. If yes, the system will check to see if either a different hip 10a or rise 10c suggestion is possible at step D5. If so, a different try-on apparel 10 will be suggested. If not, no other options appear possible and the system proceeds to DB to collect did not purchase information at step 16.

Note that as the system determines that options are no longer available in one or 10 more of the dimensions, these choices are disabled so that the user cannot select them.

Still in Figure 7, if a waist limit was not reached, the processing proceeds to Step D7, to see if the hip 10a dimensions were approved. Processing similar to that described for the waist dimensions takes place at steps D8, D9 and D10. If 15 dimension choices are still possible, the system will ask if the rise 10c of the current try-on apparel 10 is approved at Step D11. If not, limits and remaining choices are checked at steps D12 and D13. The system continues to disable those options that it has determined are no longer available.

Finally, still in Figure 7 at Step D15, the system checks to see if any dimension 20 options can still be suggested, if a try-on apparel 10 has still not been approved. If some remain, the system proceeds to step D17, to suggest one and the customer may try that one.

Turning now to Figure 8, it will be apparent to those skilled in the art that the method and apparatus of the present invention can be implemented in a variety of ways. For example, a manual system might use a cardfile 41, together with an instruction manual or sheet to go through the logic illustrated in the previous 5 figure. Alternatively, an electronic device 42, such as a dedicated palmtop device similar to a pre-programmed electronic calculator could be used. Either of these might be used in conjunction with a fax machine 43 or a modem 44 to convey the fit information to a manufacturing system.

Still in Figure 8, a voice-activated system or device 45 could be connected to a 10 computer system 40 to implement the invention.

Turning now to Figure 9, a preferred embodiment of the present invention using an interactive touchscreen 40c is shown. A simpler display device 40b could also be used with a keyboard. In a preferred embodiment a touchscreen 40c is coupled to a system 40 and a keyboard. In a preferred embodiment, an industry standard 15 personal computer system is used with a touch sensitive display and keyboard. The personal computer is programmed in Visual Basic to create the easy to use interface, but as will be apparent to those skilled in the art, any of a number of computer systems such as laptops, mainframes, mini-computers, parallel processors, neural nets and so on could be used. Similarly, any of a number of 20 programming languages exist which permit one to create a graphical user interface or a voice interface or other interface that is simple and easy for either a

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clerk or a customer to use. A preferred embodiment stores and accesses the dimension information in a matrix or table to access it. The logic flows depicted above can be implemented in any of a number of ways to access such information, including software, firmware, hardware and so on.

- 5 With reference now to Figure 10, the method used by the present invention to determine quantities and dimensions of try-on apparels 10 is shown. The flow diagram indicates that an apparel design and configuration is chosen at Step E0. In a preferred embodiment, this configuration is women's jeans. But it will be clear to those in the art that shirts, gloves, footwear or any other type of fitted apparel could be selected.
- 10

Next, at Step E1, a population sample is chosen. The size of this will depend on the type of apparel configuration selected. In a preferred embodiment, approximately 1300 individual measurements were used. At Step E2, these measurements are gathered either from individuals who are being measured for the first time, or, if any databases exist that may be relevant, from those.

- 15

In a preferred embodiment, actual measurements are taken from at least a subset of the sample, so that an expert can observe what differences in dimensions these individuals are likely to detect. For example, In a preferred embodiment, it was found that women who tried on jeans of different dimensions, were usually not able to detect differences of less than an inch in waist 10b or hip 10a dimensions. However, most women measured were able to detect differences as small as half

- 20

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an inch for rise 10c dimensions. These observations are made at Step E3 and used in Step E4, together with any relevant information about fashion limits to generate rules for selecting try-on apparels 10 at Step E4. The information is also used to decide at Step E5 how many try-on apparels 10 to make, and at Step E6,

5 how many patterns, if any.

It should be noted that while patterns are used with the try-on apparels 10 in a preferred embodiment, it is possible that other apparel such as molded or formed try-on apparels 10 may not require patterns.

Now turning to Figure 11, an illustration is given of the selection process

10 according to the method and apparatus of the present invention. In charts 11A, 11B and 11C, waist 10b, hip 10a and rise 10c dimensions for a pair of jeans are shown, together with possible inseam or hem lengths 14a.

The examples shown in figure 11 are the ones illustrated from the perspective of the clerk operating a device associated with the system in the following Figures 12

15 through 17.

Turning to Figure 12, where a touchscreen of a preferred embodiment is shown, a number of "button" options are depicted. Buttons 205, 210 and 215 indicate the clerk has entered a prospective buyer's name (Amy Smith) and the clerk's initials (bp).

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In one preferred embodiment of the invention, the clerk measures the customer and enters her dimensions, here shown as Button 220 with a Waist value of 29, Button 225 with a hip measure of 42 and Button 230 with a rise of 25 1/2.

Button 235 can be used to indicate the customer did not purchase anything.

- 5 Button 240 can be selected to backup to a previous screen and Button 245 can be used if the clerk wishes to restart.

Now in Figure 13, a screen is shown with Button 300 displaying the measurements taken for the customer and a try-on apparel 10 list 320, showing a try-on apparel 10 that has been suggested. (Figure 14 shows an alternate way of 10 entering dimensions if no measurements are taken. Either the clerk or the prospective buyer can enter the buyer's standard size from a table 223. The size chosen is translated by the system into the dimensions of a try-on apparel 10 to suggest.

Returning to Figure 13, buttons having shaded portions 337 are shown. These 15 dimension options or choices have been disabled by the system, after the customer has reported that some of the dimensions do not fit. Those Buttons 360-380 that have no shaded portion, are the remaining options.

Figure 15 shows the screen options presented after a try-on apparel 10 has been tried.

- 20 Figure 16 illustrates incorporating the inseam or hem length measurements, after

- 20 -

a try-on apparel 10 has been selected. Here, the customer wants inseam 28 in
Button 280.

Figure 17 shows a screen that can be used after all dimensions have been
approved. If the customer wants to order, Button 383 is pressed, to call up order
5 information screens, if desired. Button 385 can be used to call up screens for
shipping information for use by the manufacturing system.

And, still in Figure 17, payment methods can be selected at Button 990.

Those skilled in the art will appreciate that the embodiments described above are
illustrative only, and that other systems in the spirit of the teachings herein fall
10 within the scope of the invention.

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Claims

What is claimed is:

1. An apparatus for custom tailoring and manufacturing apparel of a selected design and configuration, comprising:
 - 5 a plurality of try-on apparels, each try-on apparel having pre-determined dimensions differing from the dimensions of each other try-on apparel; a system for storing and accessing said pre-determined dimensions of each of said try-on apparels and for entering fit information from a prospective buyer regarding those try-on apparels actually tried on by such buyer;
 - 10 a device associated with said system for collecting the relative fit information of each of said plurality of try-on apparels actually tried on by a prospective buyer and reporting said fit information for identifying final approved pre-determined dimensions for manufacturing.
2. The apparatus of Claim 1 wherein each of said plurality of try-on apparel bears a code indicating its pre-determined dimensions.
- 15 3. The apparatus of Claim 2 further comprising a plurality of patterns, each of said patterns corresponding to one of said plurality of try-on apparels and bearing its code.
4. The apparatus of Claim 3 wherein each of said plurality of patterns include parts suitable for assembling into said selected design and configuration, each part bearing a code corresponding to each of said plurality of patterns.
- 20 5. The apparatus of Claim 1 wherein said system includes rules for suggesting one of said plurality of try-on apparels to use to determine acceptable fit.

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6. The apparatus of Claim 4 wherein materials cut to correspond to said parts bear said code corresponding to one of said plurality of patterns.
7. The apparatus of Claim 1 wherein said selected design and configuration comprises women's pants.
- 5 8. The apparatus of Claim 1 wherein said selected design and configuration comprises footwear.
9. The apparatus of Claim 1 wherein each of said plurality of try-on apparels includes a measuring device attached to an edge of each of it, said measuring device having an adjustable hem length, whereby said edge can be turned up and
- 10 measured by said measuring device for capturing a desired hem length.

10. An apparatus for custom tailoring and manufacturing apparel of a selected design and configuration, comprising:
 - an electronic device for storing and accessing dimension information, said electronic device having a communications capability, and a capability for
 - 15 entering fit information from a prospective buyer regarding those try-on apparels actually tried on by such buyer;
 - a plurality of try-on apparels, each try-on apparel having pre-determined dimensions differing from the dimensions of each other try-on apparel, said pre-determined dimensions being stored in said electronic device for each of said try-on apparels;
 - 20 an indicator device associated with said electronic device for collecting the relative fit information of each of the predetermined dimensions of those try-on apparels actually tried on by a prospective buyer and reporting said fit

information for identifying final approved pre-determined dimensions for manufacturing.

11. The apparatus of Claim 10 wherein each of said plurality of try-on apparel bears a code corresponding to its dimensions.
- 5 12. The apparatus of Claim 11 further comprising a plurality of patterns, each of said plurality of patterns corresponding to one of said plurality of try-on apparels, for manufacturing a selected design and configuration.
13. The apparatus of Claim 12 wherein each of said plurality of patterns include parts suitable for assembly into a selected design and configuration, each part
- 10 bearing a code corresponding to one of said plurality of patterns.
14. The apparatus of Claim 13 wherein materials cut to correspond to said parts bear said code.
15. The apparatus of Claims 10 wherein said electronic device includes logic responsive to the entered fit information for suggesting one of said plurality of try-on apparel of different dimensions to use to determine acceptable fit.
16. The apparatus of Claim 10 wherein said each of said plurality of try-on apparel includes a measuring device attached to an edge of each of it having an adjustable hem length, whereby said edge can be turned up and measured by said measuring device for capturing a desired hem length as part of said fit information.
- 20 17. An apparatus for custom tailoring and manufacturing apparel of selected design and configuration, comprising:

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a computer system having expert system rules for storing and accessing dimension information, said computer system having a communications capability;

a plurality of try-on apparels, each of said plurality of try-on apparel

- 5 having pre-determined dimensions differing from the dimensions of each other of said plurality of try-on apparel, said pre-determined dimensions being stored in said computer system for each of said plurality of try-on apparel;

an indicator device associated with said computer system for collecting the relative fit information of each of the predetermined dimensions of those try-

- 10 on apparels actually tried on by a prospective buyer and reporting said fit information for identifying final approved pre-determined dimensions for manufacturing.

18. The apparatus of Claim 17 wherein each of said plurality of try-on apparel bears a code corresponding to its dimensions.

- 15 19. The apparatus of Claim 18 further comprising a plurality of patterns, each of said plurality of patterns corresponding to one of said plurality of try-on apparels, for manufacturing a selected design and configuration.

20. The apparatus of Claims 18 wherein each of said plurality of patterns include parts suitable for assembly into a selected design and configuration, each part

- 20 bearing a code corresponding to one of said plurality of patterns.

21. The apparatus of Claim 20 wherein materials cut to correspond to said parts bear said code.

22. The apparatus of Claim 17 wherein said expert system rules are derived from

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empirical analysis of actual use of prototypes of said plurality of try-on apparels, together with measurements to determine the number of try-on apparels to make and their dimensions.

23. The apparatus of Claim 17 wherein said expert system rules limit incremental changes in dimensions of said plurality of try-on apparels to those detectable by prospective buyers.
24. The apparatus of Claim 17 wherein said expert system rules limit the number of try-on apparels to recommend to a prospective buyer according to predetermined constraints.
- 10 25. The apparatus of Claim 17 wherein said expert system rules disable dimensional choice options during processing as those dimensional choice options no longer apply to those of said plurality of try-on apparel likely to fit.
26. The apparatus of Claim 17 wherein said indicator device is interactive.
- 15 27. The apparatus of either of Claims 10 or 17 wherein said indicator device comprises a display screen coupled to a keyboard.
28. The apparatus of either of Claims 10 or 17 wherein said indicator device comprises a touchscreen display.
29. The apparatus of either of Claims 10 or 17 wherein said indicator device comprises a voice activated system.
- 20 30. The apparatus of either of Claims 10 or 17 wherein said indicator device is controlled by an easy to use interface.
31. The apparatus of either of Claims 10 or 17 wherein said communications

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capability comprises a connection to a network.

32. The apparatus of either of Claims 10 or 17 wherein said communications capability comprises facsimile transmission.

33. The apparatus of either of Claims 10 or 17 wherein said fit information further includes order processing and shipping information.

34. The apparatus of either of Claims 10 or 17 wherein each of said plurality of try-on apparel includes a measuring device attached to an edge of it having an adjustable hem length, whereby said edge can be turned up and measured by said measuring device for capturing a desired hem length as part of said fit

10 information.

35. An apparatus for custom tailoring and manufacturing apparel of selected design and configuration, comprising:

a plurality of try-on apparels, each try-on apparel having pre-determined dimensions differing from the dimensions of each other try-on apparel and each

15 try-on apparel bearing a code indicating its pre-determined dimensions;

a plurality of patterns for manufacturing the apparel of selected design and configuration, each of said plurality of patterns having a code and pre-determined dimensions corresponding to one of said plurality of try-on apparel;

a system for storing and accessing information about said codes and pre-determined dimensions of said try-on apparels and said patterns, said system associated with a device for collecting final approved fit dimensions;

a manufacturing system for cutting, tracking, stitching, treating and shipping finished apparel of selected design and configuration constructed from

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coded patterns and parts according to said approved fit dimensions.

36. The apparatus of Claim 35 further comprising a marker imposed upon each of said plurality of try-on apparel.

37. The apparatus of Claim 35 wherein said marker comprises a label.

5 38. The apparatus of Claim 35 wherein said marker comprises a washable substance.

39. The apparatus of Claim 35 wherein said code further comprises the numeric dimensions of said try-on apparel.

40. The apparatus of Claim 35 wherein said code further comprises a bar code 10 image.

41. The apparatus of Claim 35 wherein said patterns are laid out to maximize use of materials.

42. The apparatus of Claim 35 wherein said manufacturing system is responsive to volume and arrival time of orders in such a way as to optimize inventories.

15 43. The apparatus of Claim 35 wherein said manufacturing system is responsive to volume and arrival time of orders in such a way as to optimize delivery time.

49. An apparatus for custom tailoring and manufacturing apparel of selected design and configuration, comprising:

20 a plurality of try-on apparels, each try-on apparel having pre-determined dimensions differing from the dimensions of each other try-on apparel and each try-on apparel bearing a code indicating its pre-determined dimensions;

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a system for storing and accessing said pre-determined dimensions of said try-on apparels;

a measuring device attached to an edge of each of said try-on apparel having an adjustable hem length, whereby said edge can be turned up and

5 measured by said measuring device for capturing a desired hem length;

a device associated with said system for collecting the relative fit information of each of the predetermined dimensions of those try-on apparels actually tried on by a prospective buyer, together with desired hem length selected by said buyer and reporting said hem length and said fit information for

10 identifying final approved pre-determined dimensions for manufacturing.

45. The apparatus of Claim 44 further comprising a plurality of patterns, each of said patterns corresponding to one of said plurality of try-on apparels and hem lengths.

46. The apparatus of Claim 44 wherein said measuring device is a tape made of a

15 flexible material having increment markings on it.

47. The apparatus of Claim 44 wherein said markings include all permissible dimensions of hem length for said part in said try-on apparel.

48. A method for custom tailoring and manufacturing apparel of selected design and configuration, comprising the steps of :

20 making a plurality of try-on apparels, each try-on apparel having pre-determined dimensions differing from the dimensions of each other try-on

apparel and each try-on apparel bearing a code indicating its pre-determined dimensions;

storing and accessing said pre-determined dimensions of each of said try-on apparels in a system capable of receiving fit information from a prospective 5 buyer regarding those try-on apparels actually tried on by such buyer;

associating a device with said system for collecting the relative fit information of each of the predetermined dimensions of said try-on apparels actually tried on by a prospective buyer and reporting said fit information for identifying final approved pre-determined dimensions for manufacturing.

10 49. The method of Claim 48 further comprising the step of making a plurality of patterns, each of said patterns corresponding to one of said plurality of try-on apparels and bearing its code.

50. The method of Claim 48 wherein the step of accessing and storing includes incorporating rules for suggesting try-on apparels to use to determine acceptable 15 fit.

51. The method of Claim 48 wherein the step of making a plurality of patterns includes the step of breaking each pattern into parts, each part bearing a code corresponding to said pattern.

52. The method of Claim 51 comprising a further step of marking materials cut 20 to correspond to said parts with said pattern's code.

53. The method of Claim 48 wherein the step of making said try-on apparels further comprises the step of choosing women's pants as said selected design and configuration .

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54. The method of Claim 48 wherein the step of making said try-on apparels further comprises the step of choosing footwear as said selected design and configuration .

55. The method of Claim 48 wherein the step of making a plurality of try-on apparels includes the step of attaching a measuring device to an edge of each of said plurality of try-on apparel having an adjustable hem length, whereby said edge can be turned up and measured by said measuring device for capturing a desired hem length.

56. A method for custom tailoring and manufacturing apparel of selected design 10 and configuration , comprising the steps of:

storing and accessing dimension and code information in an electronic device , said electronic device having a communications capability, and a capability for receiving fit information from a prospective buyer regarding those try-on apparels actually tried on by such buyer;

15 making a plurality of try-on apparels, each try-on apparel having pre-determined dimensions differing from the dimensions of each other try-on apparel and each try-on apparel bearing a code indicating its pre-determined dimensions, said code and said pre-determined dimensions being stored in said electronic device for each of said try-on apparels;

20 associating an indicator device with said electronic device for collecting the relative fit information of each of the predetermined dimensions of those try-on apparels actually tried on by a prospective buyer and reporting said fit information for identifying final approved pre-determined dimensions for

manufacturing.

57. The method of Claim 56 further comprising the step of making a plurality of patterns, each of said patterns corresponding to one of said plurality of try-on apparels.

5 58. The method of Claim 57 wherein the step of making a plurality of said patterns further includes the step of making parts, each part bearing a code corresponding to said pattern.

59. The method of Claim 58 comprising the step of cutting materials to correspond to said parts includes the step of marking such materials with said 10 pattern's code.

60. The method of Claim 56 wherein the step of making a plurality of try-on apparels includes the step of attaching a measuring device to an edge of each of said plurality of try-on apparel having an adjustable hem length, whereby said edge can be turned up and measured by said measuring device for capturing a 15 desired hem length.

61. A method for custom tailoring and manufacturing apparel of selected design and configuration, comprising:
deriving expert system rules for storing and accessing dimension information in a computer system, said computer system having a 20 communications capability;
making a plurality of try-on apparels, each try-on apparel having pre-

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determined dimensions differing from the dimensions of each other try-on apparel and each try-on apparel bearing a code indicating its pre-determined dimensions, said code and said pre-determined dimensions being stored in said computer system for each of said try-on apparels;

- 5 associating an indicator device with said computer system for collecting the relative fit information of each of the predetermined dimensions of those try-on apparels actually tried on by a prospective buyer and reporting said fit information for identifying final approved pre-determined dimensions for manufacturing.
- 10 62. The method of Claim 61 further comprising the step of making a plurality of patterns, each of said patterns corresponding to one of said plurality of try-on apparels.
63. The method of Claim 62 wherein the step of making a plurality of said patterns further includes the step of making parts, each part bearing a code
- 15 corresponding to said pattern.
64. The method of Claim 63 wherein the step of cutting materials to correspond to said parts includes the step of marking such materials with said pattern's code.
- 20 65. The method of Claim 61 wherein the step deriving expert system rules further comprises deriving said expert system rules by empirically analyzing actual use of prototypes of said plurality of try-on apparel, and analyzing measurements made, to determine the number of try-on apparels to make and their dimensions.

66. The method of Claim 61 wherein the step of deriving expert system rules further comprises including rules limiting incremental changes in dimensions of said try-on apparels to those detectable by target consumers.

67. The method of Claim 61 wherein the step of deriving expert system rules further comprises including rules limiting the number of try-on apparels to recommend to a prospective buyer according to pre-determined constraints.

68. The method of Claim 61 the step of deriving expert system rules further comprising including rules disabling dimensional choice options during processing as those dimensional choice options no longer apply to the try-on apparels likely to fit.

69. The method of Claim 61 further comprising the step of associating an interactive indicator device with said computer system.

70. The method of either Claim 56 or 61 wherein the step of associating said indicator device includes the step of making it interactive.

71. The method of either Claim 56 or 61 wherein the step of associating said indicator device further includes coupling a display screen to a keyboard.

72. The method of either Claim 56 or 61 wherein the step of associating said indicator device further coupling a touchscreen display with said system.

73. The method of either Claim 56 or 61 wherein the step of associating said indicator device further includes coupling a voice activated system to said system.

74. The method of either Claim 56 or 61 wherein the step of associating said

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indicator device further includes the step of controlling it by an easy to use interface.

75. The method of either Claim 56 or 61 wherein communications capability further comprises the step of connecting it to a network.

5 76. The method of either Claim 56 or 61 wherein communications capability further comprises the step of including capabilities for facsimile transmission.

77. The method of either Claim 56 or 61 wherein the step of identifying said fit information further includes the step of including order processing and shipping information.

10 78. The method of either Claim 56 or 61 wherein the step of making a plurality of said try-on apparels includes the step of attaching a measuring device to an edge of each of said plurality of try-on apparel having an adjustable hem length, whereby said edge can be turned up and measured by said measuring device for capturing a desired hem length as part of said fit information.

15 79. A method for custom tailoring and manufacturing apparel of selected design and configuration, comprising the steps of:

making a plurality of try-on apparels, each try-on apparel having pre-determined dimensions differing from the dimensions of each other try-on apparel and each try-on apparel bearing a code indicating its pre-determined

20 dimensions;

making a plurality of patterns, each pattern having a code and pre-determined dimensions corresponding to one of said try-on apparels;

marking each part of materials cut from each pattern with the code

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corresponding to said pattern using a marker;
storing and accessing information about said codes and pre-determined dimensions of said try-on apparels and said patterns in a system, said system associated with a device for collecting final approved fit dimensions;

5 manufacturing finished apparel of selected design and configuration by cutting, tracking, stitching, treating and shipping apparels constructed from coded patterns and parts according to said approved fit dimensions.

80. The method of Claim 79 wherein the step of marking includes using labels as said markers.

10 81. The method of Claim 79 the step of marking includes using a washable substance as said marker.

82. The method of Claim 79 wherein the step of marking includes a step for marking each of said plurality of try-on apparel.

83. The method of Claim 79 wherein the step of marking includes the step of 15 using as said code the numeric dimensions of said try-on apparel.

84. The method of Claim 79 wherein the step of marking includes the step of using as said code a bar code image.

85. The method of Claim 79 wherein the step of making a plurality of patterns further includes the step of laying them out optimizing use of materials.

20 86. The method of Claim 79 wherein the step of manufacturing finished apparel further includes the step of responding to volume and arrival time of orders in

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such a way as to optimize inventories.

87. The method of Claim 79 wherein the step of manufacturing finished apparel further includes the step of responding to volume and arrival time of orders in such a way as to optimize delivery time.

5

88. A method for custom tailoring and manufacturing apparel of selected design and configuration, comprising:

making a plurality of try-on apparels, each try-on apparel having pre-determined dimensions differing from the dimensions of each other try-on

10 apparel and each try-on apparel bearing a code indicating its pre-determined dimensions;

storing and accessing said pre-determined dimensions of said try-on apparels in a system;

attaching a measuring device to an edge of each of said plurality of try-on 15 apparel having an adjustable hem length, whereby said edge can be turned up and measured by said measuring device for capturing a desired hem length;

associating a device with said system for collecting the relative fit information of each of the predetermined dimensions of those try-on apparels actually tried on by a prospective buyer, together with desired hem length selected

20 by said buyer and reporting said hem length and said fit information for identifying final approved pre-determined dimensions for manufacturing.

89. The method of Claim 88 further comprising the step of making a plurality of patterns, each of said patterns corresponding to one of said plurality of try-on

apparels and hem lengths.

90. The method of 88 wherein the step of attaching a measuring device further includes the step of fashioning it as a tape made of a flexible material having increment markings on it.

5 91. The method of Claim 90 wherein the step of marking said tape includes the step of indicating all permissible dimensions of hem length for said part in said try-on apparel.

92. A method of collecting dimension information for custom tailoring and manufacturing apparel of selected design and configuration, comprising the
10 steps of:

determining population sample size and dimensions to measure;
gathering measurements of individuals in population sample size in said dimensions;
observing objective differences of said dimensions detectable by

15 individuals;
generating rule sets based on said measurements.

93. The method of Claim 92 further comprising the steps of:
making a plurality of try-on apparels, each try-on apparel having pre-determined dimensions based on said measurements and differing from the
20 dimensions of each other try-on apparel and each try-on apparel bearing a code indicating its pre-determined dimensions.

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94. The method of Claim 61 further comprising the step of forming a plurality of patterns, each pattern having a code and pre-determined dimensions corresponding to one of said plurality of try-on apparel.

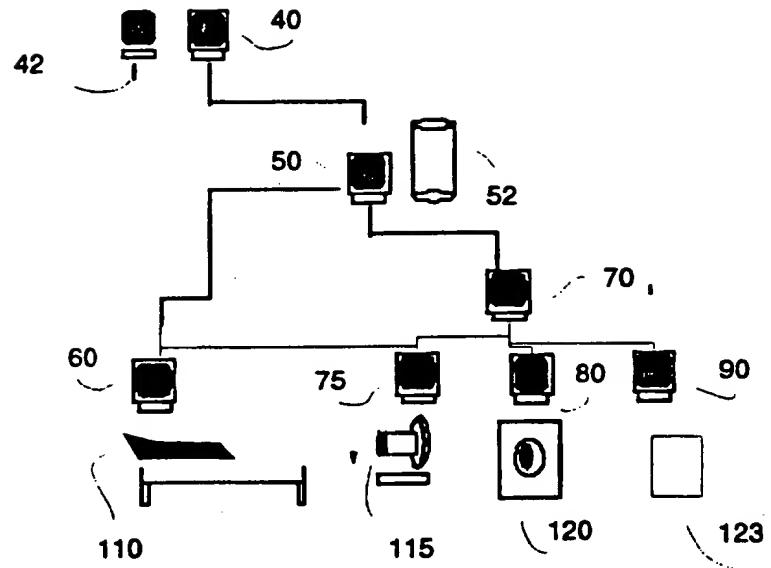
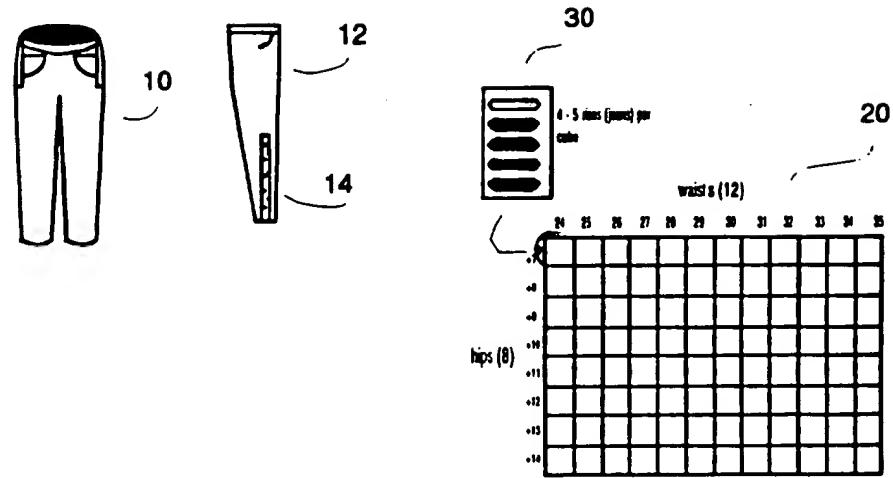
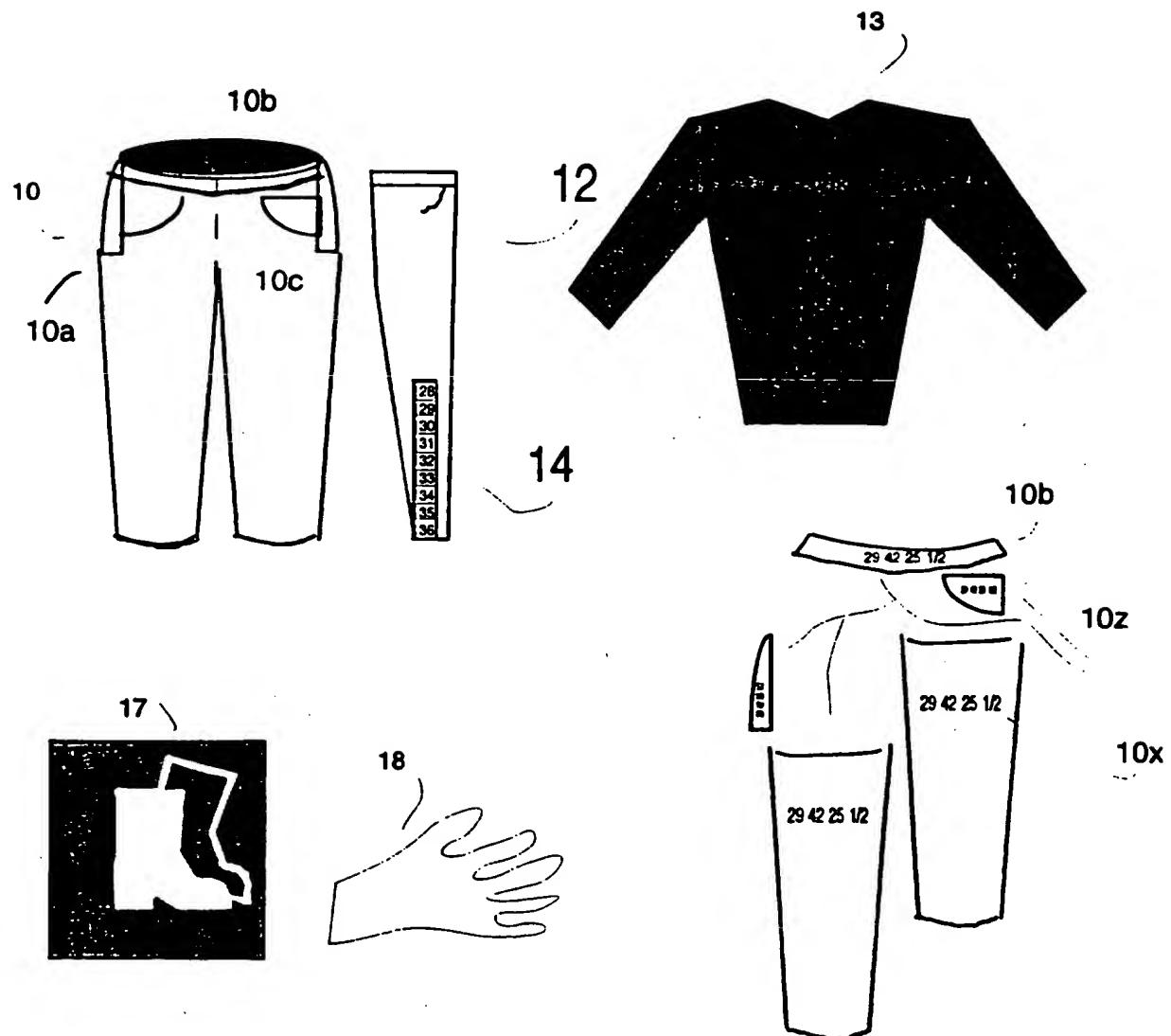
Fig. 1

Fig. 2

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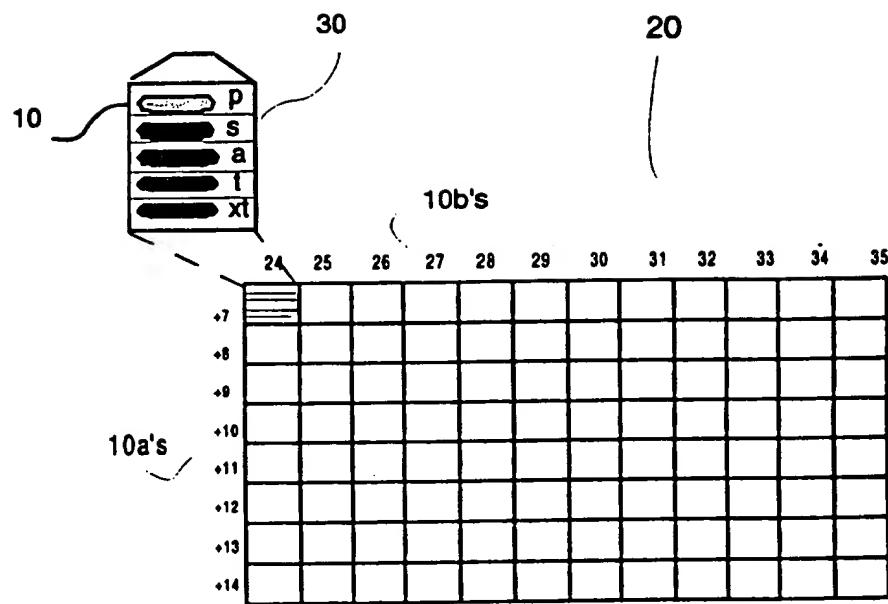
Fig. 3

Fig. 4

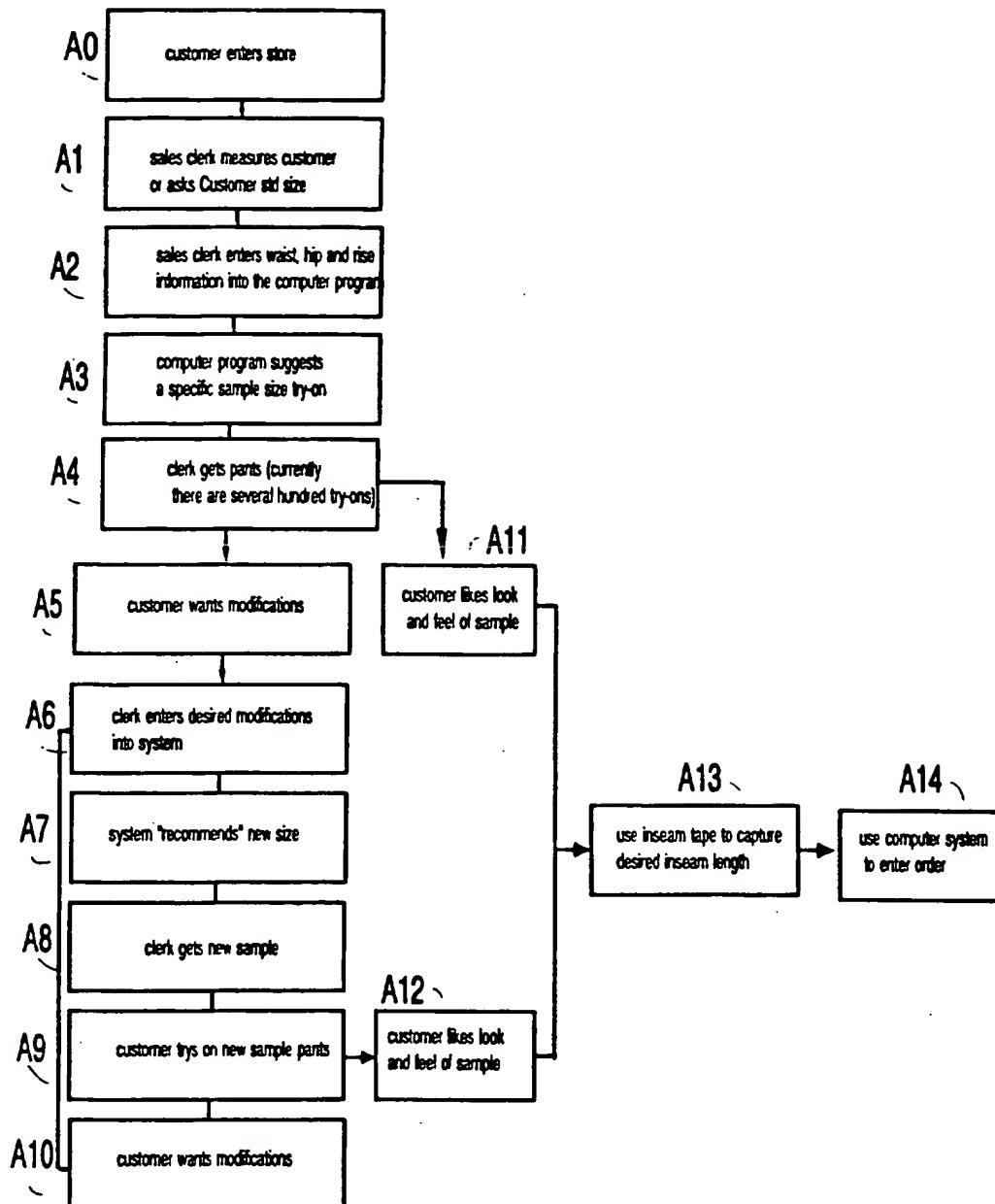


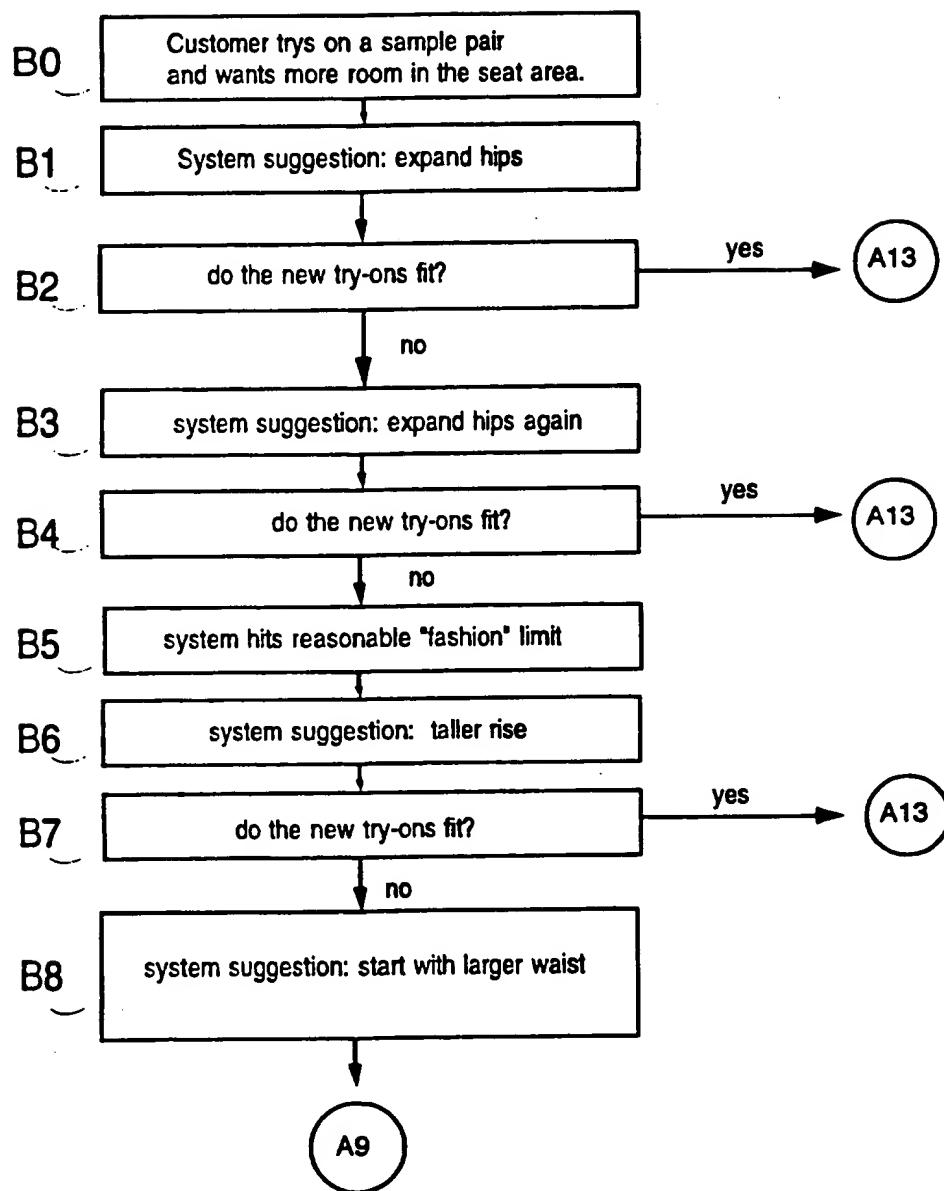
Fig. 5

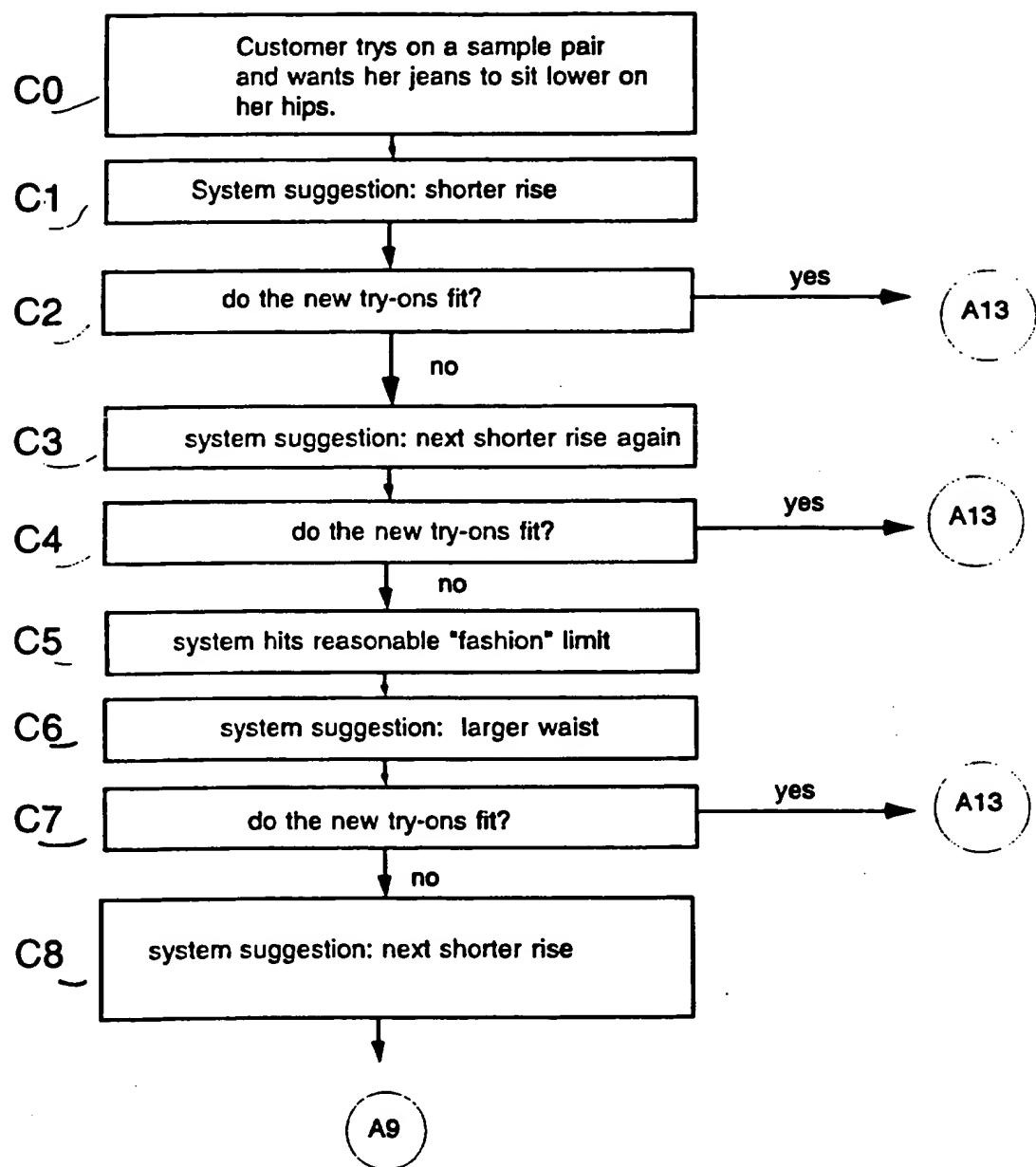
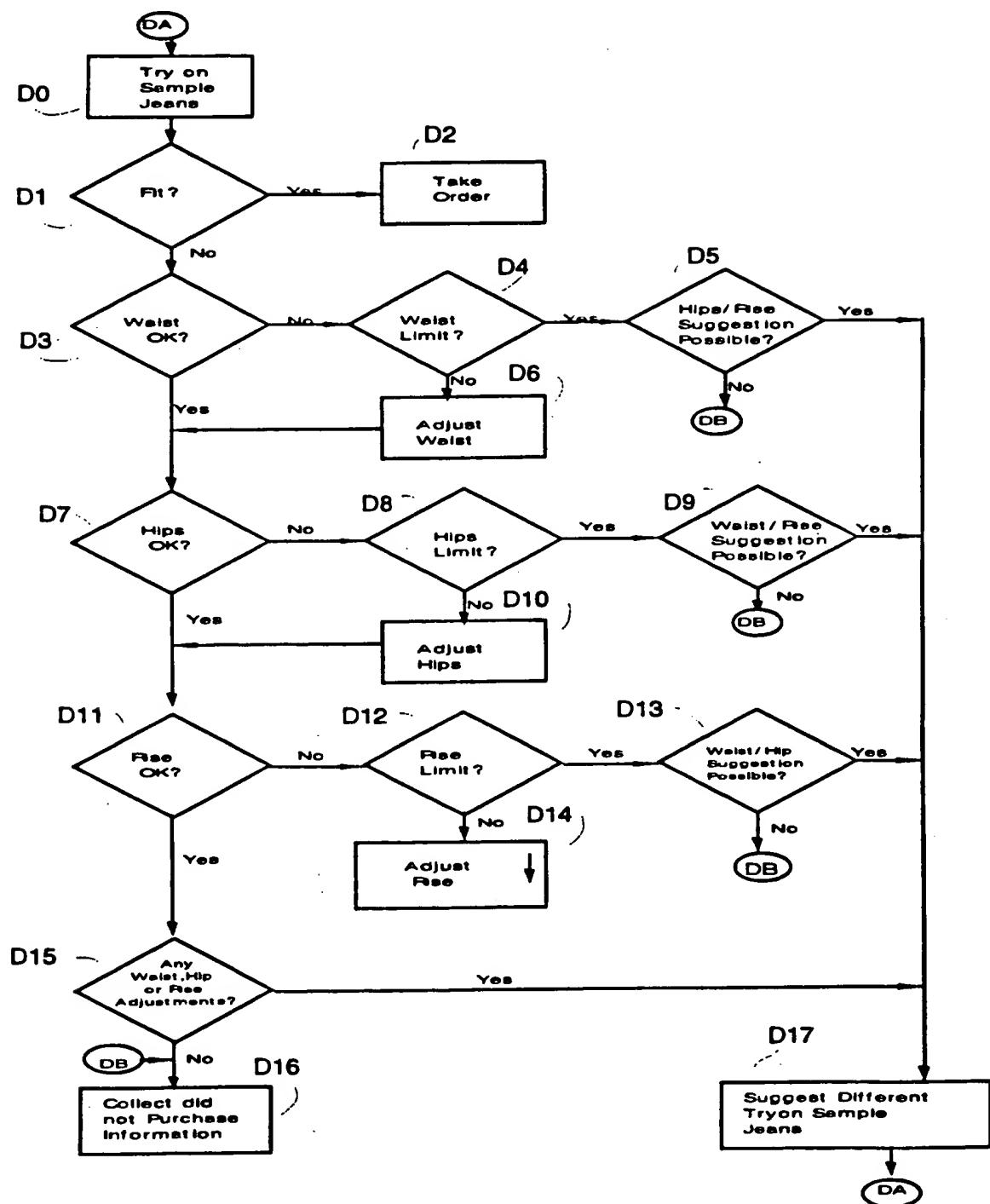
Fig. 6

Fig. 7



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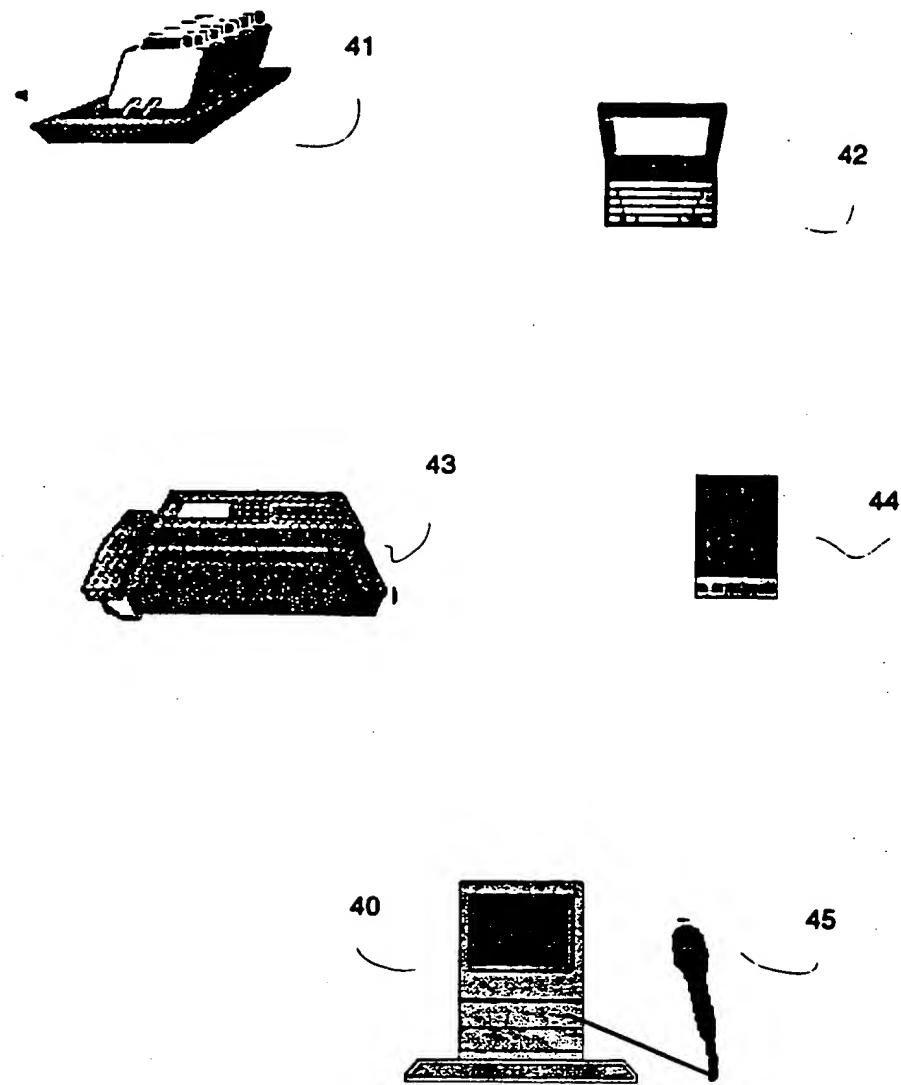
Fig. 8

Fig. 9

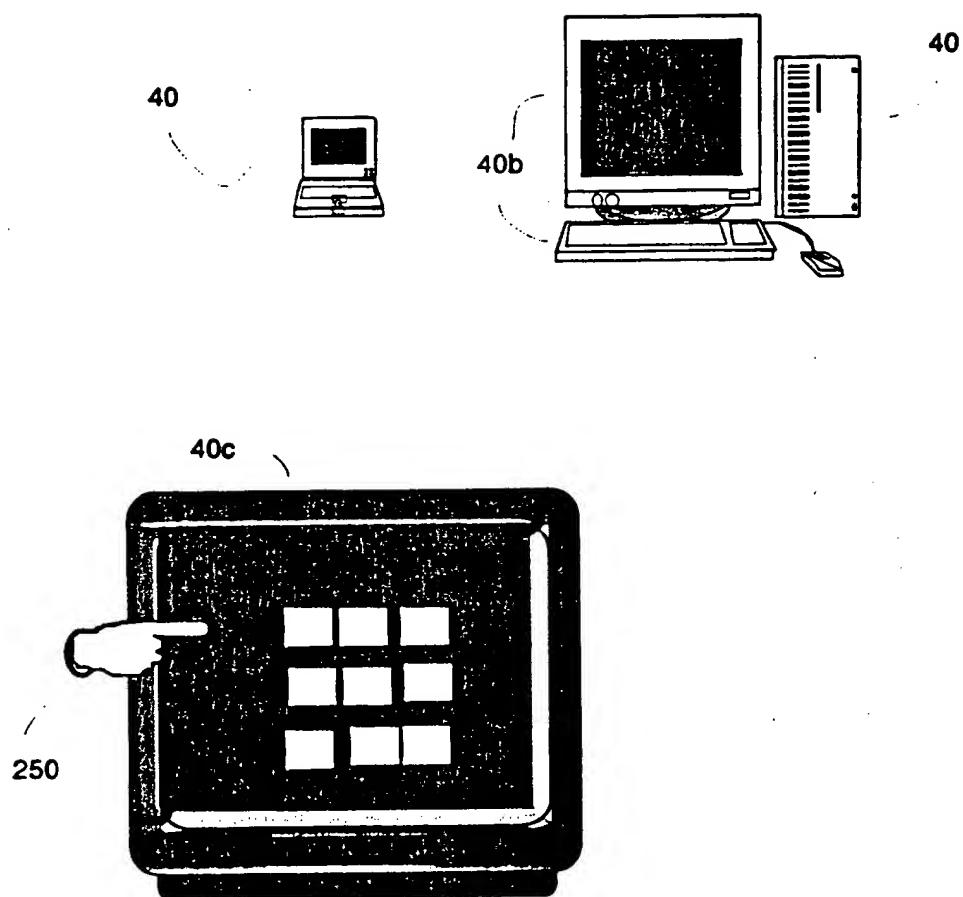
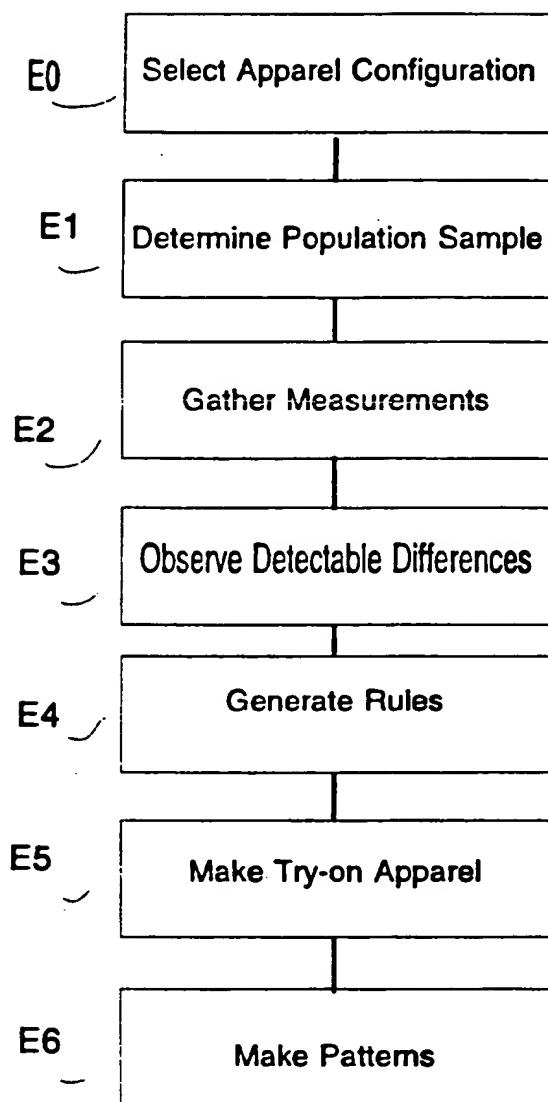
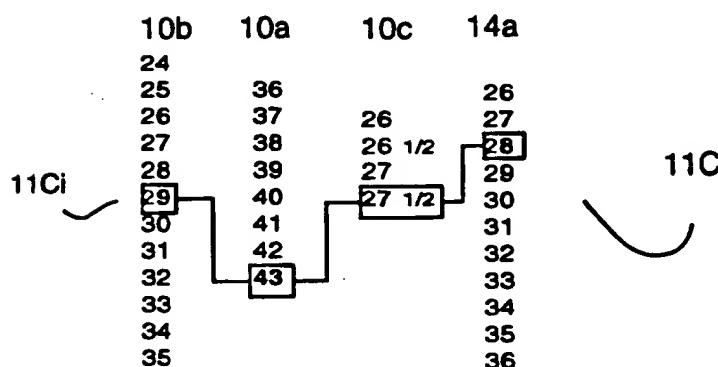
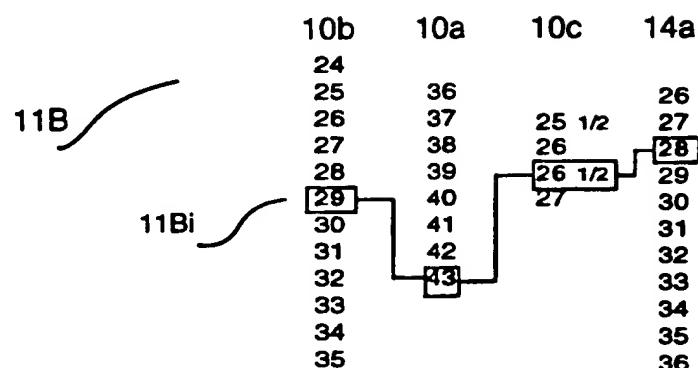
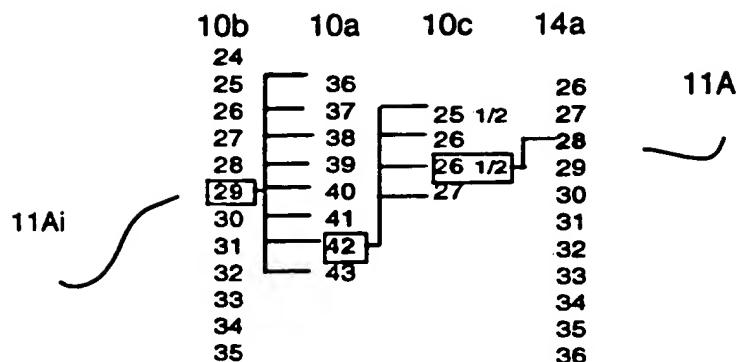


Fig. 10



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Fig. 11



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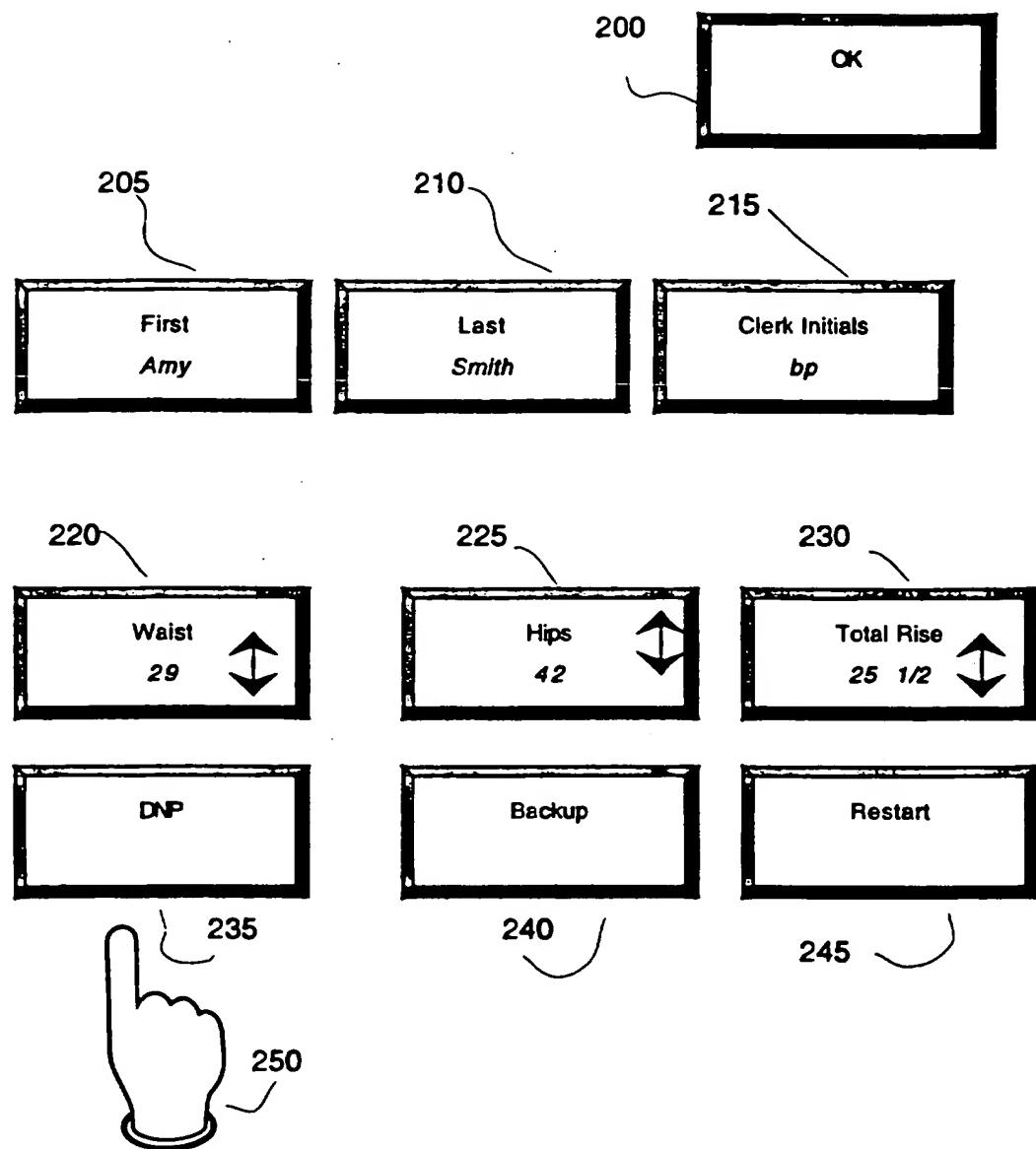
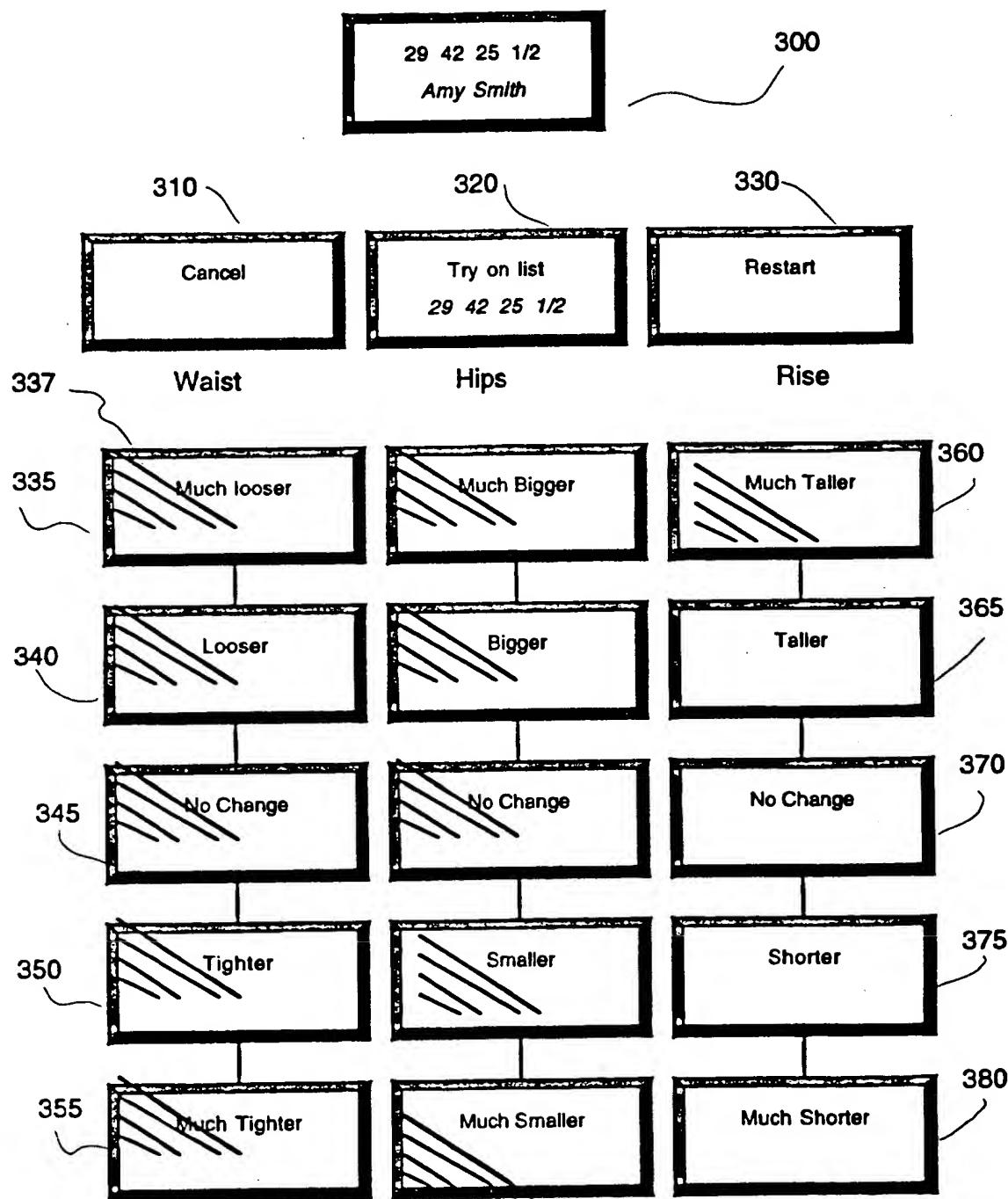
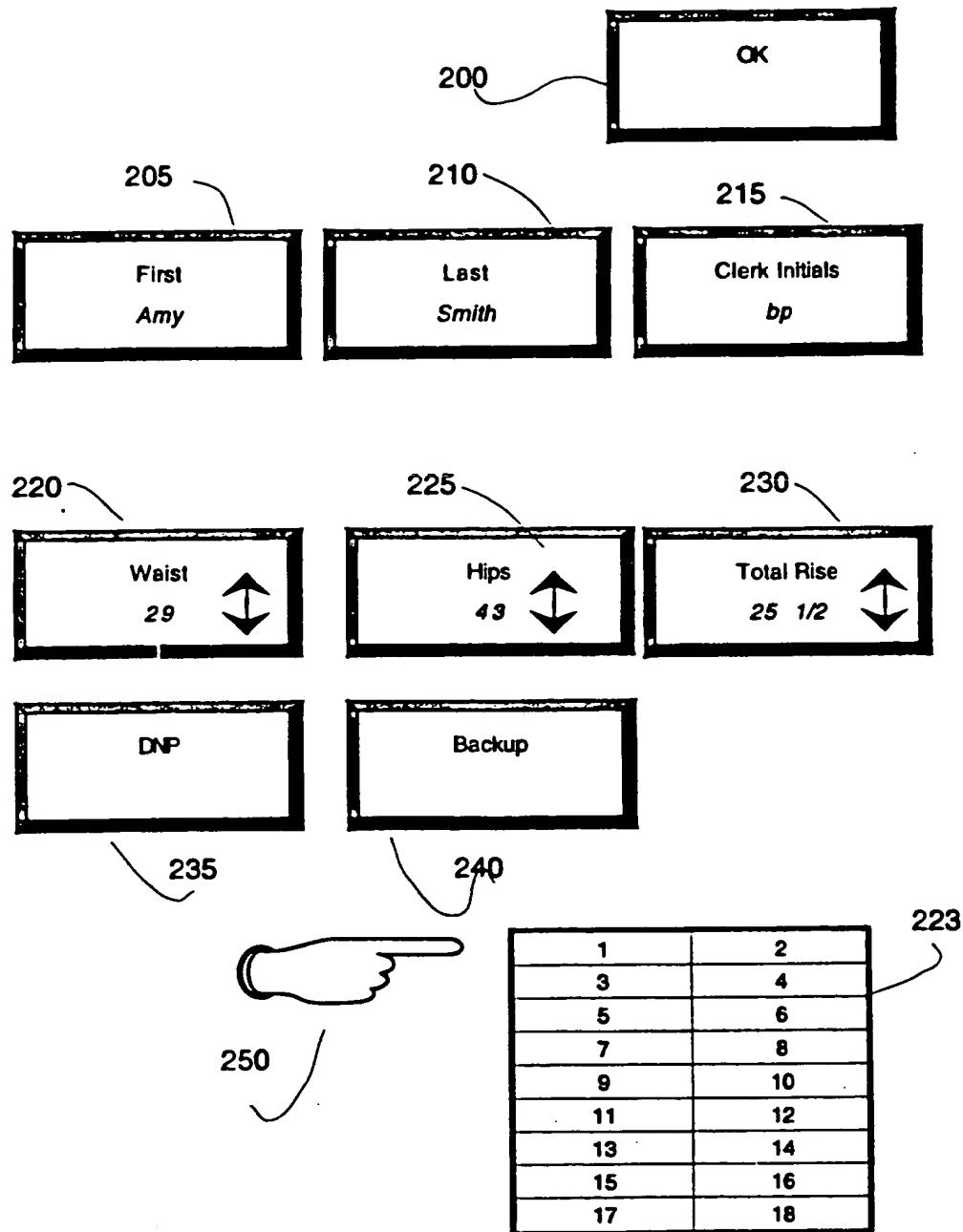
Fig. 12

Fig. 13

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Fig. 14



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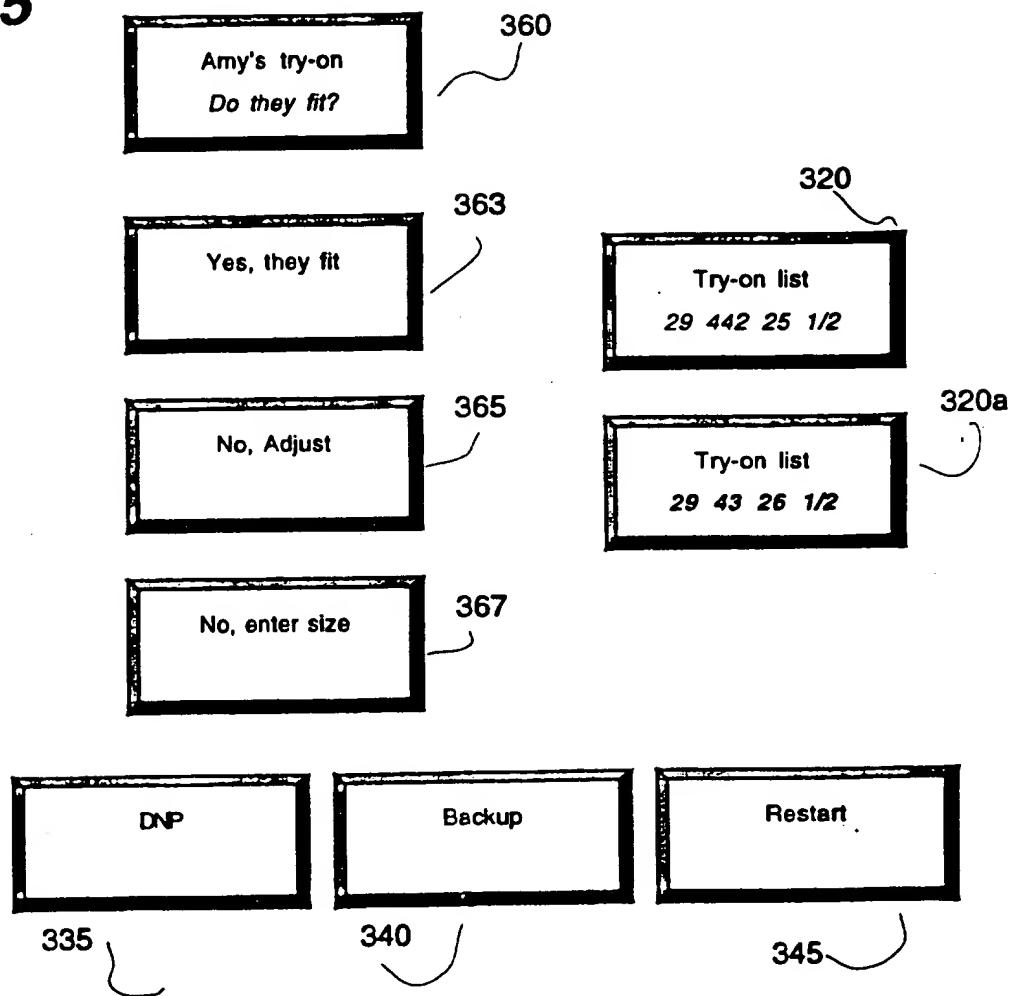
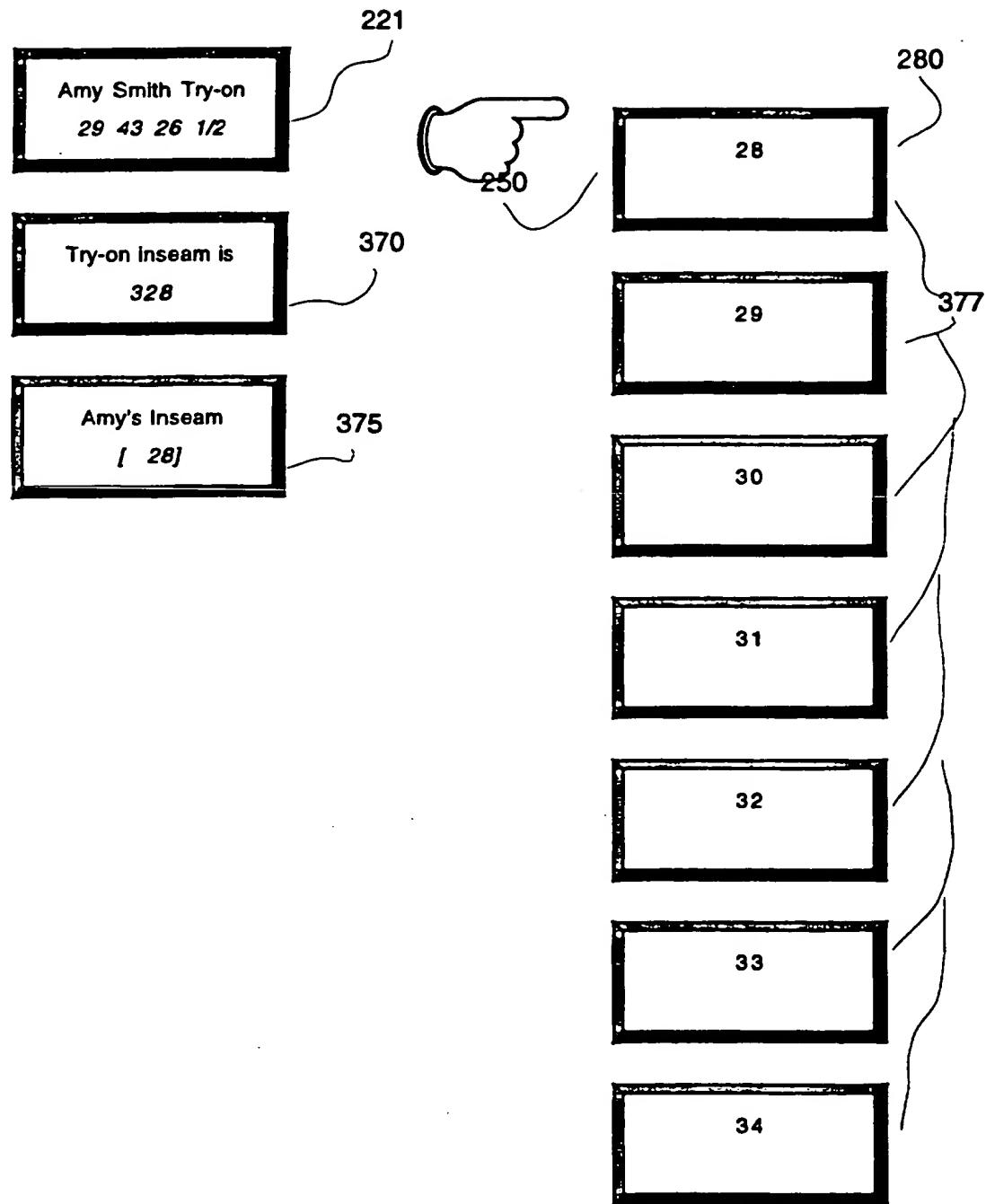
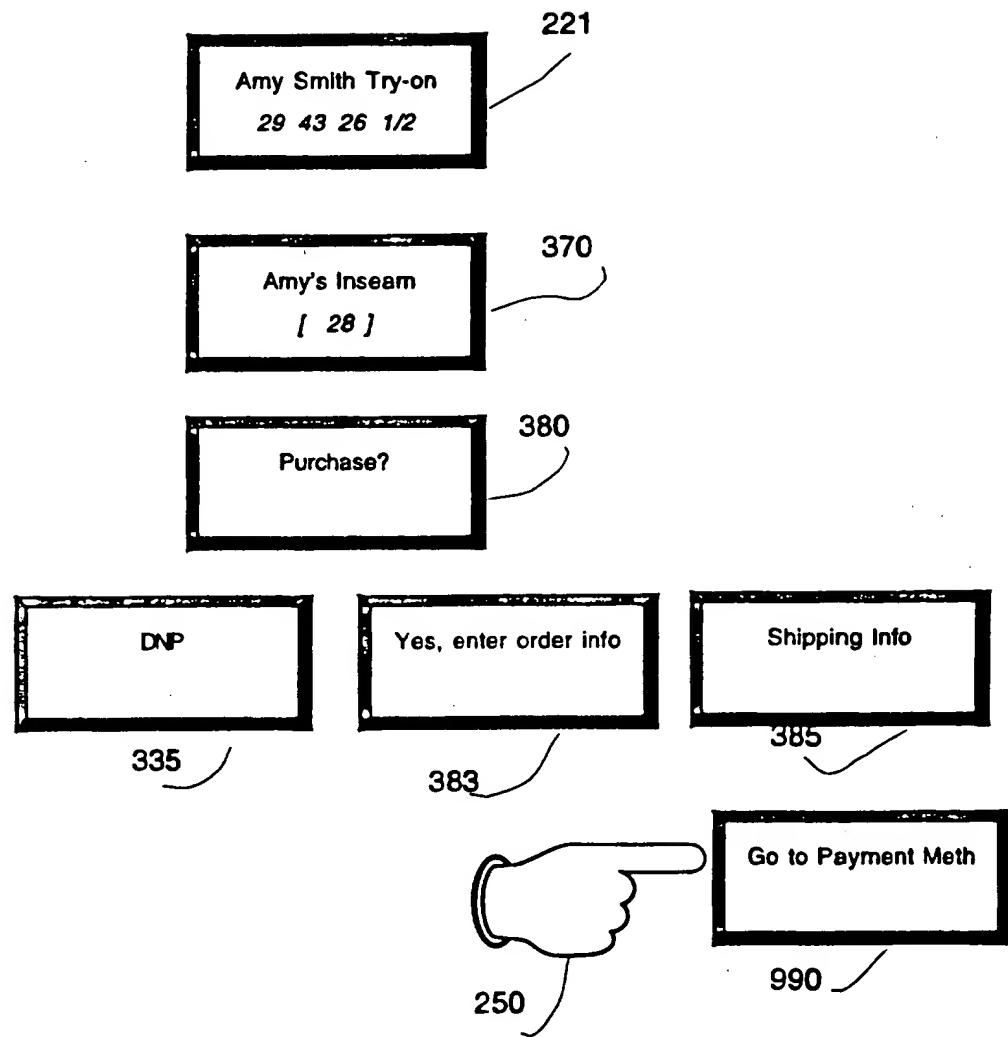
Fig. 15

Fig. 16

17/17

Fig. 17

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US95/10253

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :G06F 15/00, 17/00
US CL :364/188, 468, 470

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 364/188, 468, 469, 470; 395/50, 54, 68

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

NONE

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

APS, search terms: custom?(2a)(cloth? or tailor? or apparel?) and (pos or point of sale or retail)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US, A, 4,149,246(GOLDMAN) 10 APRIL 1979, SEE abstract and summary.	1-4, 10-13, 17-22, 35-37, 44, 45, 48-50, 56, 57, 61-63, 79-82, 88-93
A	US, A, 4,546,434(GIOELLO) 08 OCTOBER 1985, see claim1.	1, 10, 17, 35, 44, 48, 56, 61, 79, 88, 93
A	US, A, 4,598,376(BURTON ET AL.) 01 JULY 1986, see figure 2 and the invention summary in col. 2-3.	1, 10, 17, 44, 56, 79, 80, 92

 Further documents are listed in the continuation of Box C. See patent family annex.

•	Special categories of cited documents:	T	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
•A	document defining the general state of the art which is not considered to be part of particular relevance	X	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
•E	earlier document published on or after the international filing date	Y	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
•L	document which may throw doubt on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)		
•O	document referring to an oral disclosure, use, exhibition or other means	Z	document member of the same patent family
•P	document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search

20 SEPTEMBER 1995

Date of mailing of the international search report

03 NOV 1995

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Form PCT/ISA/210 (second sheet)(July 1992)*

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US95/10253

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US, A, 4,873,643(POWELL ET AL.) 10 OCTOBER 1989, see col. 1-2, claim 1.	1, 17, 35, 44, 48, 56, 61, 79, 88, 92, 93
Y	US, A, 4,885,844(CHUN) 12 DECEMBER 1989, see figure 7 and col. 6, line 66 to col. 7, line 65.	1, -3, 10, 17, 18, 35, 36, 44, 48, 56, 57, 61, 62, 79, 80, 88, 92.
Y	US, A, 4,916,624(COLLINS ET AL.) 10 APRIL 1990, see entire document.	1-94
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